UNIVERSITY OF THE AEGEAN

Department of Shipping
Trade and Transport

IN.S.T.A.L.
INSTITUTE OF SHIPPING & TRANSPORT APPLICATIONS K.M.LO.

Green transport in island areas

Prof. Amalia Polydoropoulou

Dr. Athena Tsirimpa

3rd International Scientific Conference
on Energy and Climate Change

7-8 October 2010, Athens (Hellas)

Outline

- Background & Objectives
- Literature Review
- Decision Making Framework
- Modelling Framework
- Data Analysis
- Conclusions

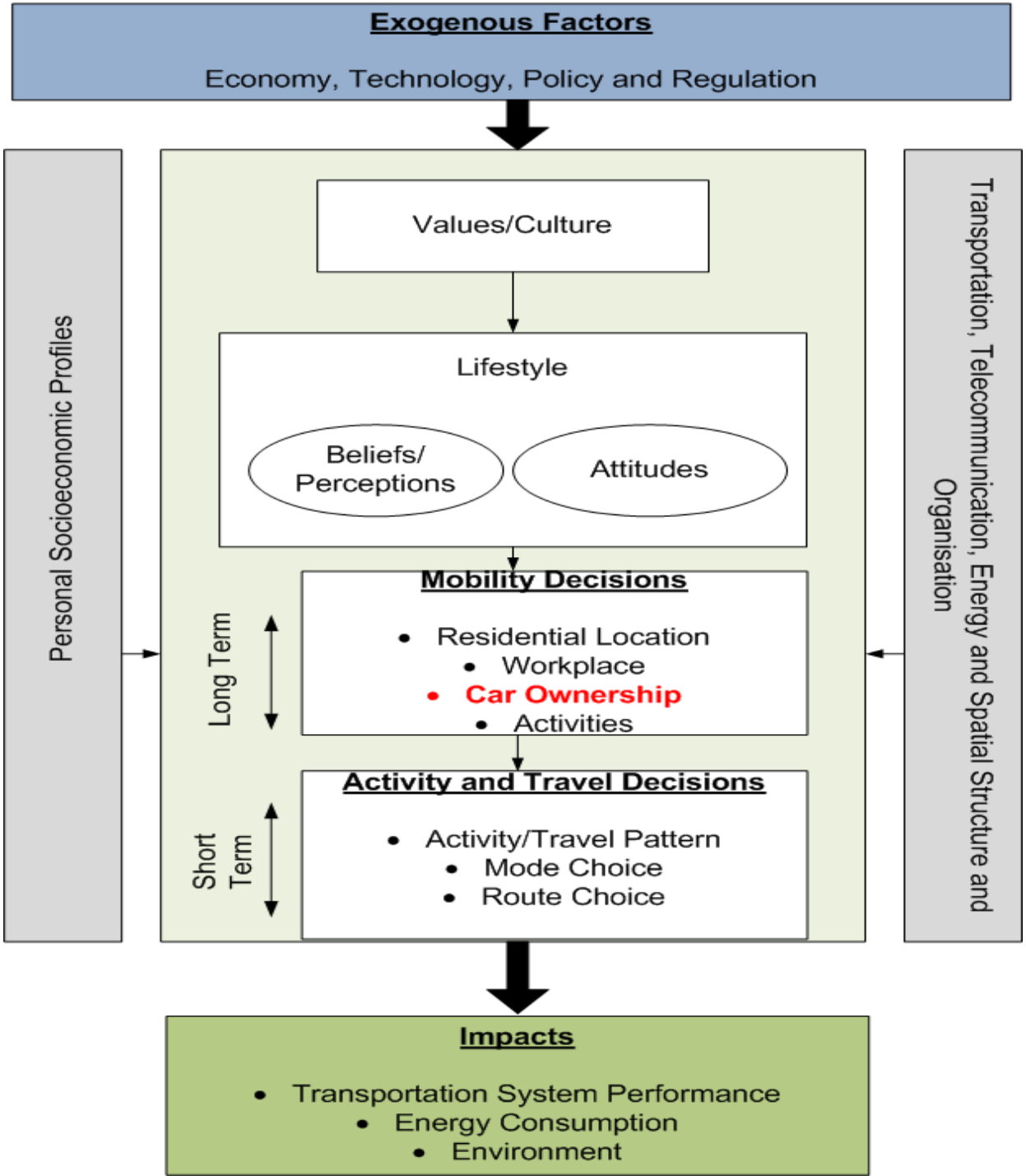
Objectives

- Identify and quantify factors influencing car ownership / mode choice behaviour;
- Understand the factors affecting GREEN transport choices in islander areas that would lead to:
  - increased well-being; and
  - reduction of carbon emissions
- Develop a decision making framework for green transport related choices.

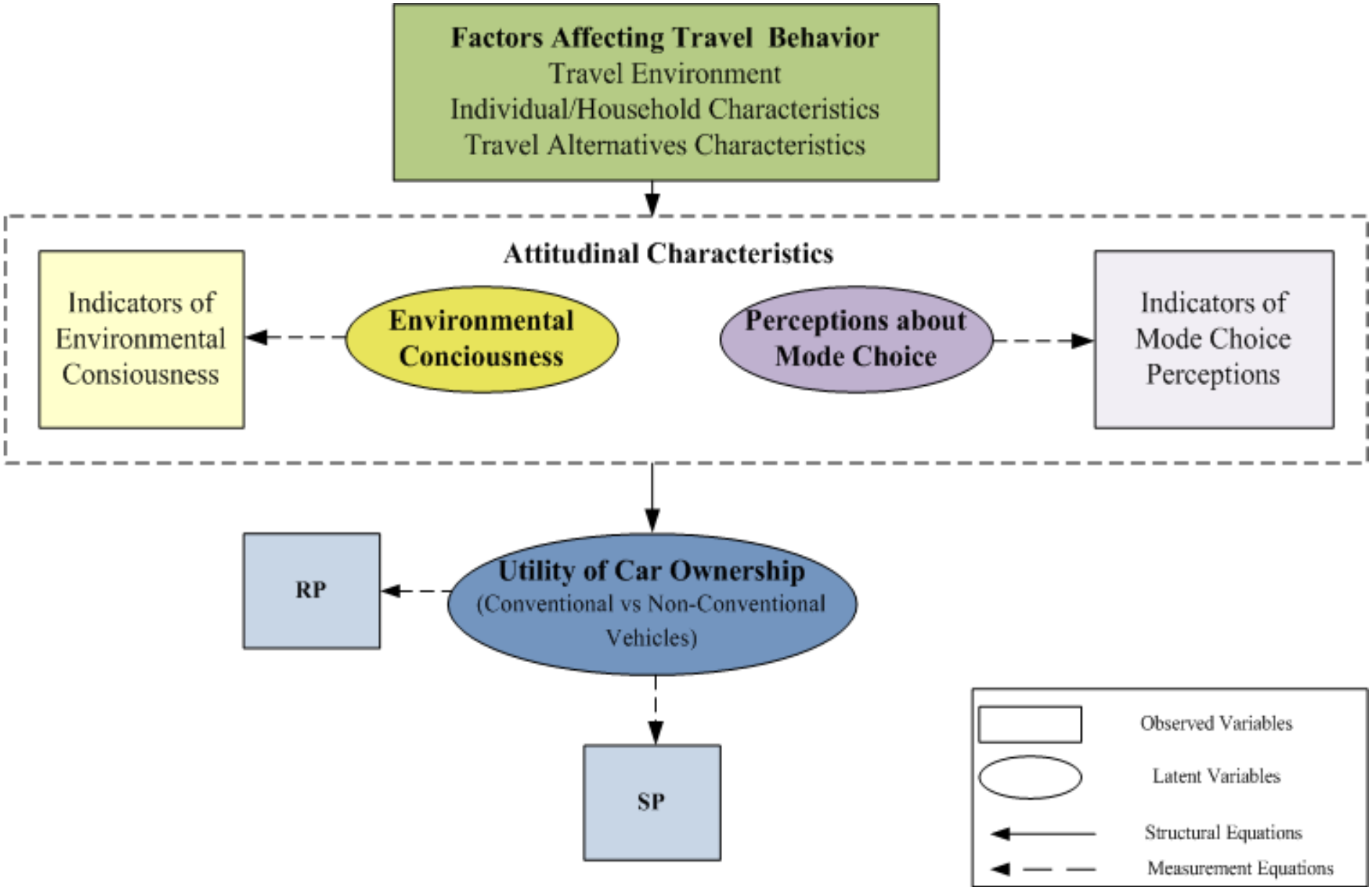
Literature Review

- Greece has increased its greenhouse emissions by 61% from 1990-2007 (EEA, 2009);
- Road transport, is one of the most difficult sectors to manage in terms of CO_2 emissions and a major contributor of CO_2 ;
- The market penetration rates of hybrid or/and electrical vehicles of the overall road transport fleet (Clement et al., 2007, 2008; Hadley and Tsvetkova, 2008) would vary from 10 to 30% by 2030;
- The net reduction due to the use of electric vehicles depends primarily on the source of fuel for electricity generation (LaveLester et al., 1995; Sgoutas, 1995);

Decision Making Framework



Car Ownership Modeling Framework

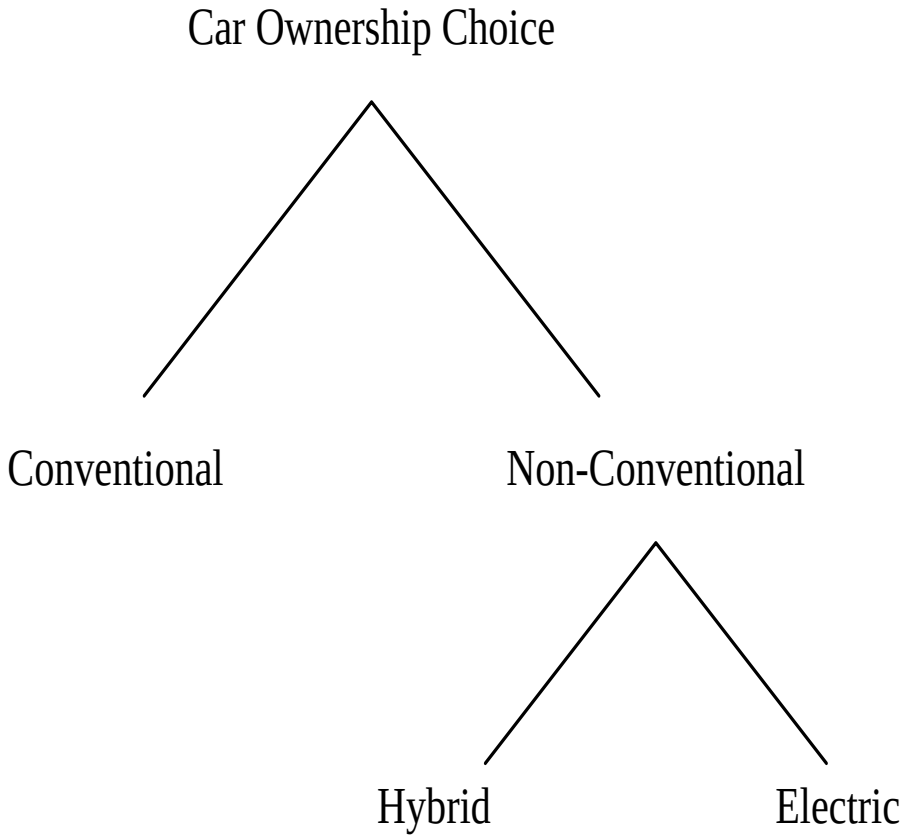


Data Collection

- The survey was conducted in Chios island (North Aegean Region), through personal interviews to island residents
- The survey included 4 sections:
  - travelers' daily activity pattern (mode choice, route choice, number of activities etc.);
  - attitudes towards the environment;
  - basic demographic information; and
  - stated preferences towards the choice between the use of conventional and non-conventional vehicles (hybrid/electric vehicles).
- Data Collection Period: November 2009 and April 2010
- Pilot Sample: 200 individuals

Stated Preference Experiments (1/2)

- Choice: Ownership of Conventional or Non-Conventional Private Car
  - Conventional Car
  - Hybrid Car
  - Electric Car



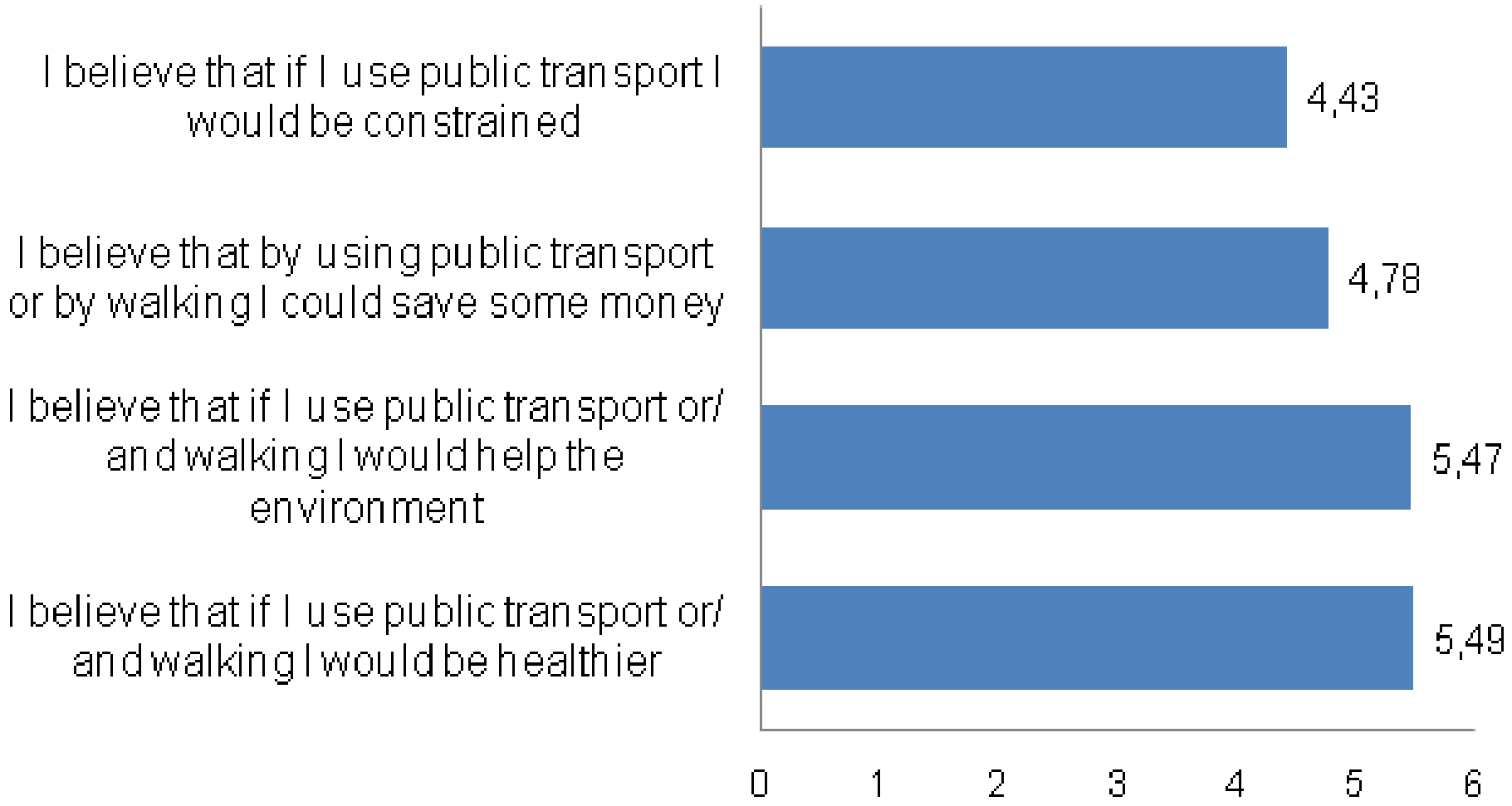
Stated Preference Scenarios (2/2)

- The stated preference scenarios included the following attributes with 2 to 4 levels each :
  - Purchase Cost
  - Operational Cost (liters/km)
  - Annual Tax
  - Insurance Cost
  - CO_2 Emissions

Descriptive Statistics

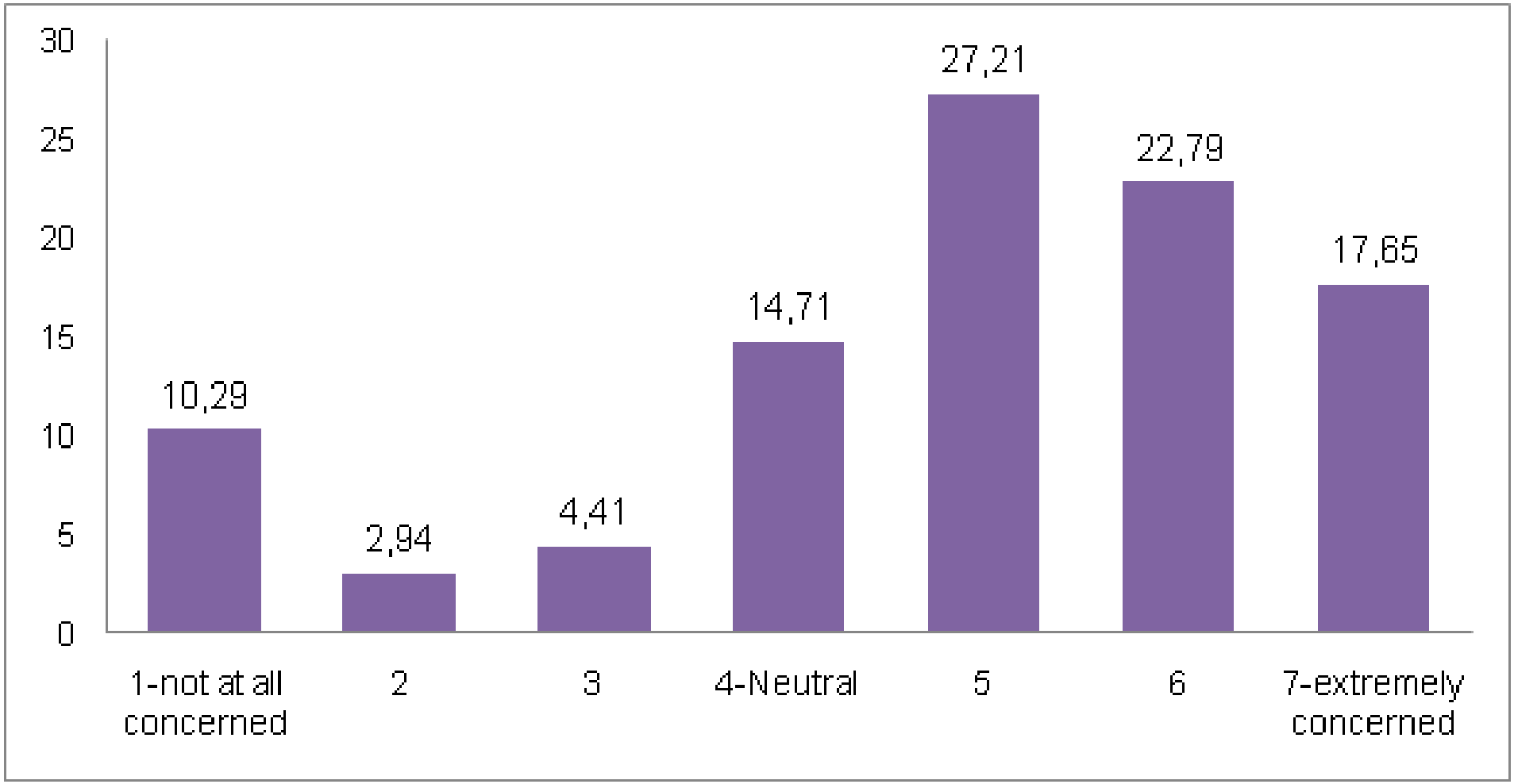
- 2/3 use car for their daily trips because of:
  - its comfort and usefulness;
- 14% travel actively (walking and/or bicycling) for:
  - physical activity and environmental reasons;
- Morning hours travel is for work or work related activities,
- The majority of the sample did not report any activities during a typical afternoon.

Perceptions about Public Transport and Walk

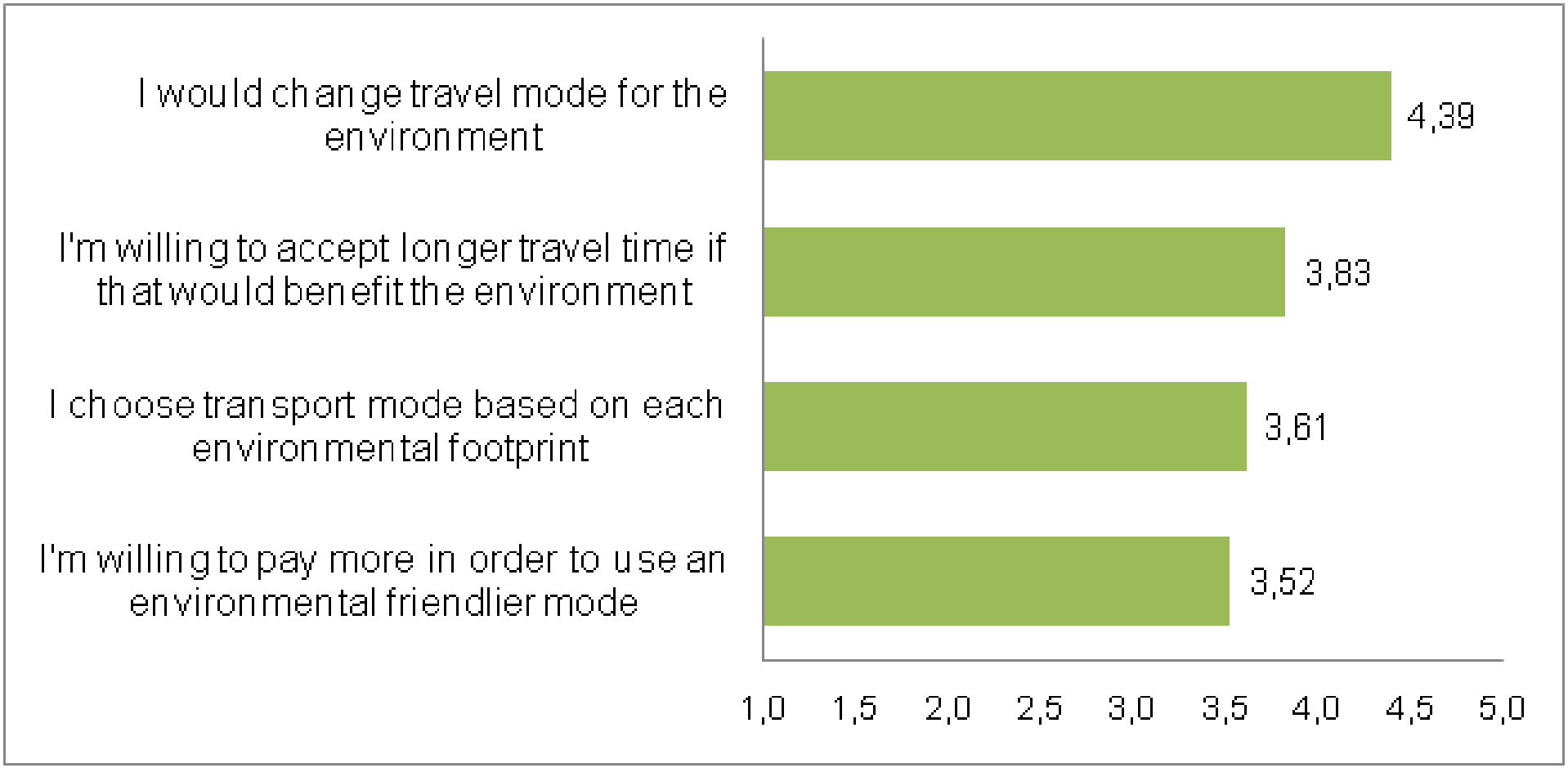


7-point likert scale, where 1=highly unlikely and 7=extremely likely

Emissions Concern

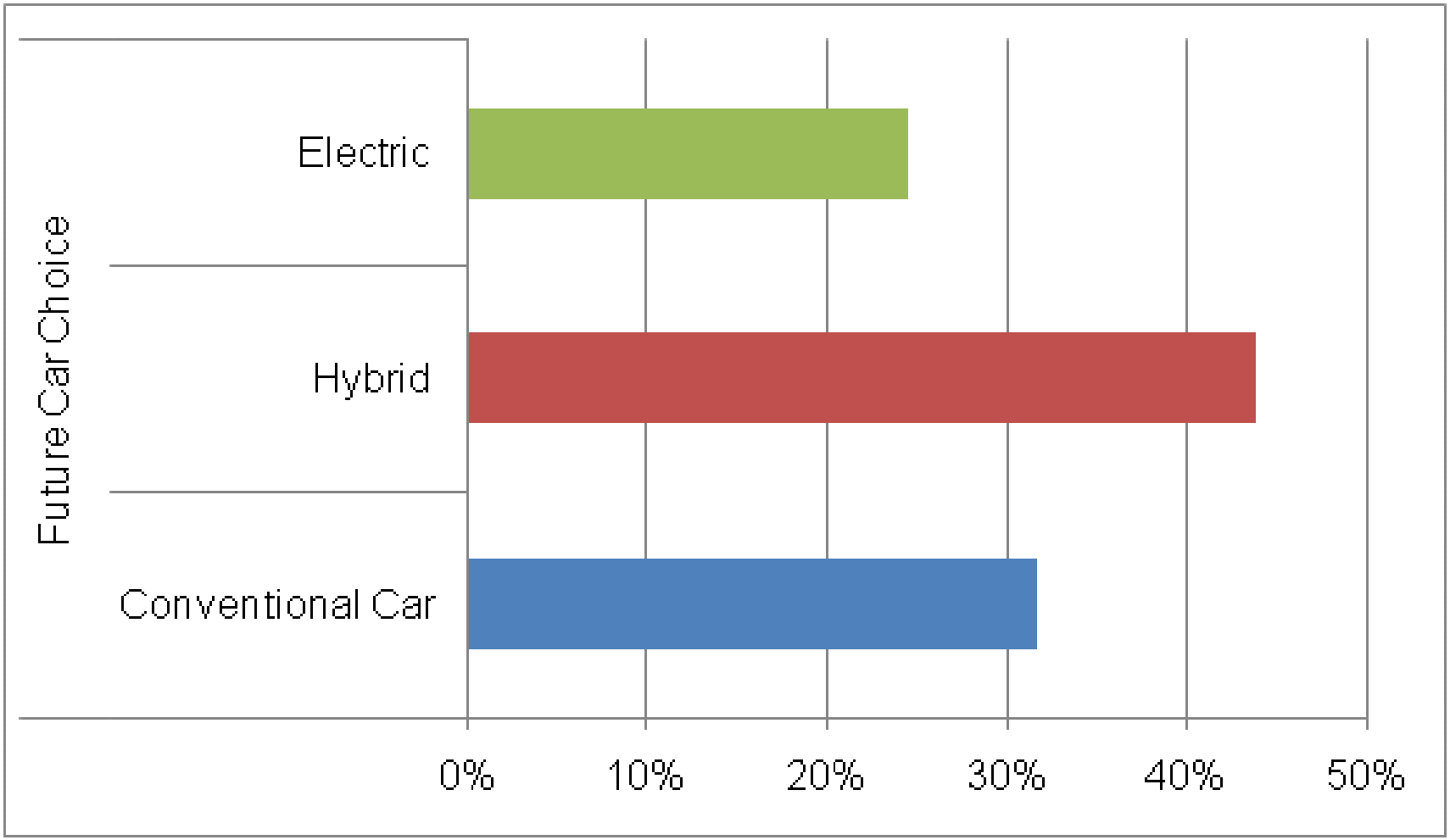


Environmental Consciousness



7-point likert scale, where 1=completely disagree and 7=completely agree

Car Ownership in a Stated Preference Scenario



Conclusions

- A comprehensive approach for the decision making process of individuals, that takes into account:
  - individuals' attitudes and perceptions regarding the environment and mode choice;
- Although individuals are concerned about the emission produced from road transport in the island of Chios, their environmental consciousness is relatively low;
- The majority is willing to switch from a conventional vehicle to a hybrid one, but are less willing to switch to an electric vehicle.

On Going Research

- The results obtained from this paper, are still being explored;
- A car ownership model (conventional versus non conventional vehicles) is currently being estimated and validated;
- This model will allow the identification of:
  - different market segments through attitudinal market segmentation techniques.
- Additional data is currently collected so that the sample is fully representative of the population.